2) Waiter holding plate and walking

4) Kinetic & potential

5) @ K = ½mv² & time KE

b) KE 3 times

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9) $W = Fd$

a) same

b) Jen

c) same

16) $W = 0.20\,J$

$d = 0.450\,cm = 0.00450\,m$

$W = Fd$

$F = W/d = 44.4\,N$

17) $F = 50.0\,N$

$d = 7.0\,m$

$W = Fd$

$W = 350\,J$

23) $m_1 = 55kg$ $V = 6.3 m/s$

$m_2 = 95kg$ $V = 4.2 m/s$

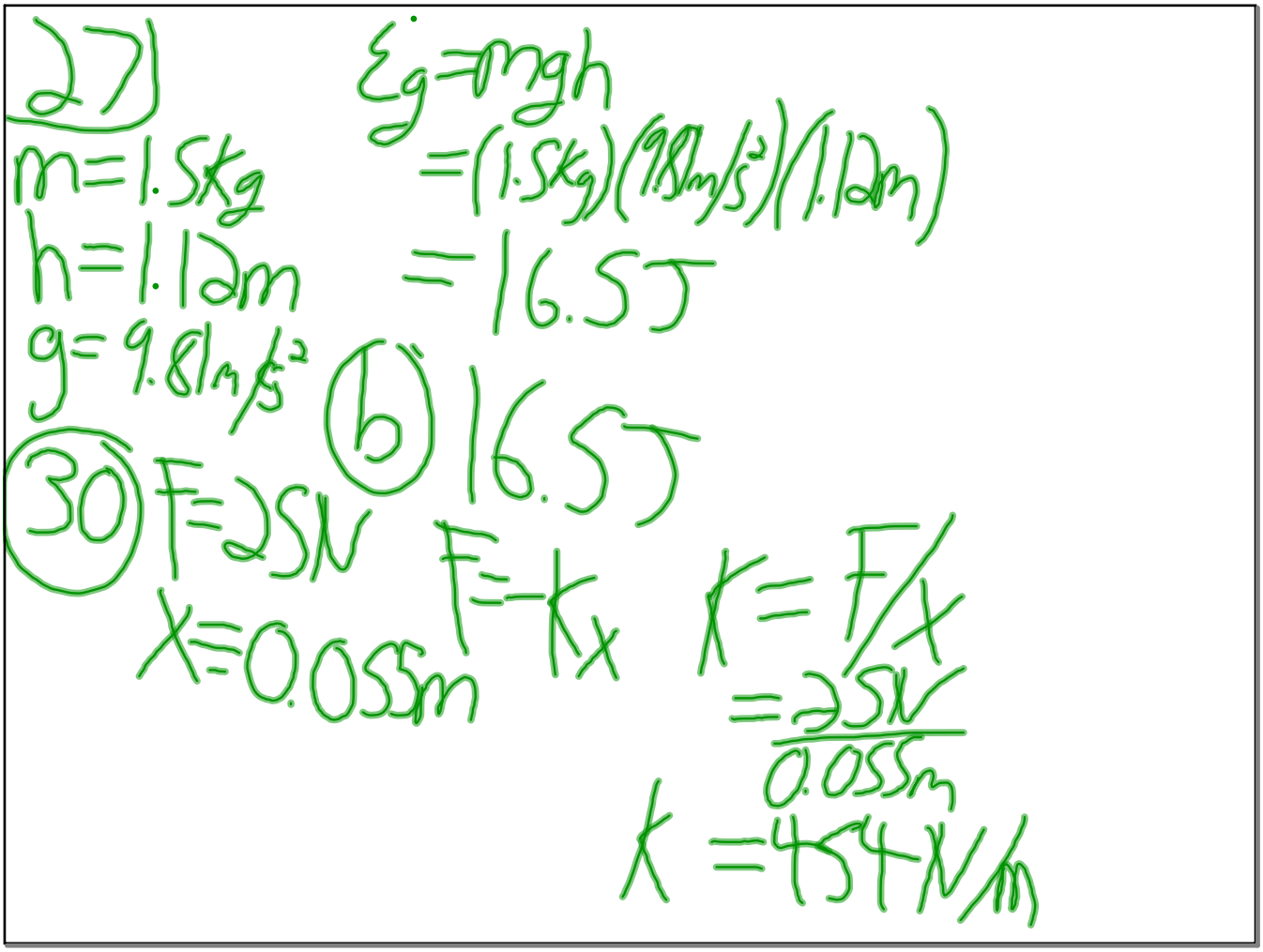
$KE = \frac{1}{2}mv^2 = \frac{1}{2}(55kg)(6.3m/s)^2 = 1,091.5J$

$KE = \frac{1}{2}(95kg)(4.2m/s)^2 = 837.9J$

24) $PE = 6800J$ $PE = mgh$

$h = 14.0m$

$m = \frac{PE}{gh} = \frac{6800J}{(9.81)(14.0m)} = 49.5kg$


27)
m=1.5kg
h=1.12m
g=9.81m/s²
Eg=mgh
=(1.5kg)(9.81m/s²)(1.12m)
=16.5J
b) 16.5J
30) F=25N
x=0.055m
F=-kx
k=F/x
=25N/0.055m
k=454N/m

33) $K = 120\ N/m$

$x = 8.0\ cm = 0.08\ m$

$E_e = \frac{1}{2}Kx_f^2 - \frac{1}{2}Kx_i^2$ ($x_i = 0$)

$= \frac{1}{2}(120\ N/m)(0.08\ m)^2$

$= 0.384\ J$

b) $F = Kx$

$= (120\ N/m)(0.08\ m)$

$= 9.6\ N$ $E_e = \frac{1}{2}Kx^2$

34) $m = 35\ kg$ $E_e = 155\ J$

$K = 4945\ N/m$ $E_g = mgh$

$x = 25\ cm = 0.25\ m$ $h = \frac{E_g}{mg} = \frac{155\ J}{(35\ kg)(9.81\ m/s^2)}$

$h = 0.45\ m$

36) $P = W/t$

$W = 7.0 \times 10^3\ J$ $P = \frac{7.0 \times 10^3\ J}{20\ s}$

$t = 20\ s$

$P = 350\ W$

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39) $m = 3000\,kg$ $E_g = mgh$
$h = 15.0\,m$ $= (3000\,kg)(9.81\,m/s^2)(15.0\,m)$
$= 441{,}450\,J$
$74\% = 0.74$
$= 326{,}673\,J$
$P = W/t$
$t = 60\,s$ $P = 326{,}673\,J / 60\,s$
$P = 5{,}445\,W$

22) $V_i = 0\,m/s$
$h_i = 70\,m$
$h_f = 30\,m$
$V_f =$

$E_{ki} + E_{pi} = E_{kf} + E_{pf}$
$mgh_i = \frac{1}{2}mV_f^2 + mgh_f$
$gh_i - gh_f = \frac{1}{2}V_f^2$
$V_f = \sqrt{2[(9.8)(70) - (9.81)(30\,m)]} = V_f$
$V_f = 28\,m/s$

23) $h_i = 8.5\,cm = 0.085\,m$
$h_f = 0\,m$
$V_i = 0\,m/s$
$V_f =$

$V_f = 0$, $h_f = 0$
$E_{ki} + E_{pi} = E_{kf} + E_{pf}$
$mgh_i = \frac{1}{2}mV_f^2$
$V = \sqrt{2gh}$
$V = \sqrt{2(9.8\,m/s^2)(0.085\,m)}$
$V = 1.3\,m/s$

25) $K = 950\,N/m$
$X = -0.20\,m$
$m = 1.5\,kg$

$E_e = \frac{1}{2}kx^2$
$= \frac{1}{2}(950\,N/m)(0.20\,m)^2$
$= 19\,J$
$E_k = \frac{1}{2}mV^2$
$V = \sqrt{\frac{2E_k}{m}}$
$V = 25.3\,m/s$

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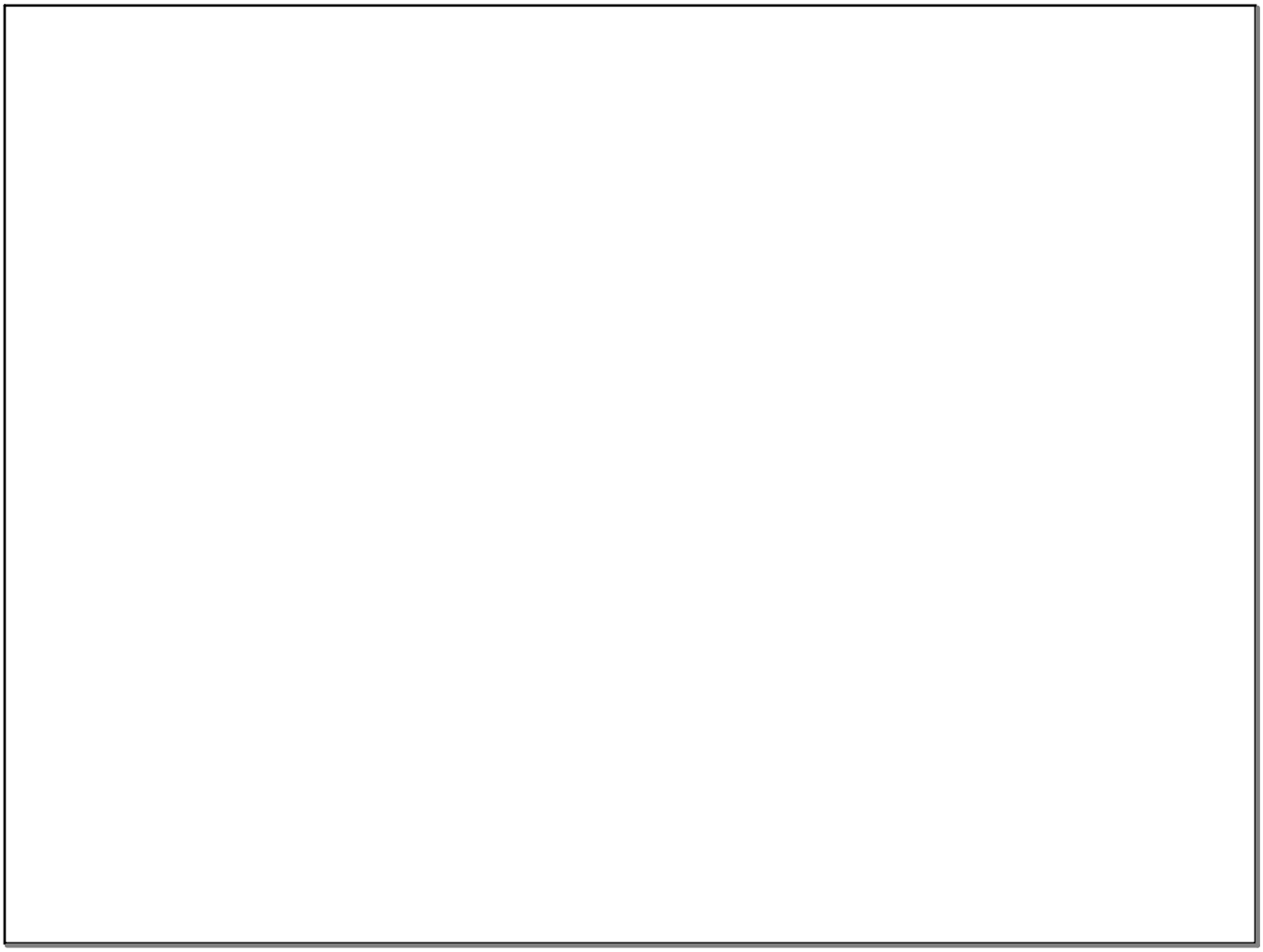

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